SPECIFICATION AMENDMENTS

On page 1, above line 1, insert--Priority Claim

The present application claims priority of European Patent Application No. 03103958.9 filed 24 October 2003.--

On page 1, above line 1, insert--Field of the Invention--

On page 1, above line 6, insert--Background of the Invention--

On page 2, above line 16, insert--Summary of the Invention--

Paragraph on line 16 of page 2 has been amended as follows:

--It is therefore an object of the invention to provide a ~~more reliability added~~ method ~~for~~ of assessing fluid pressure behaviour in a region of interest in a subsurface formation that adds more reliability.--

On page 2, after line 18, please add the following paragraph:

--In accordance with the invention, there is provided a method of assessing pore fluid pressure behaviour in a region of interest in a subsurface formation below an earth surface, the method comprising: determining a stress value representative of formation stress in a measurement region of the subsurface formation being located displaced from the region of interest; and detecting presence of non-hydrostatic pore fluid pressure in the region of interest using the stress value.--

On page 2, delete line 19-33.

On page 3, delete line 1-33.

On page 4, delete line 1-33.

On page 5, delete line 1-16.

Paragraph on line 17 of page 5 has been amended as follows:

~~--Generally, prior~~ Prior to assessing the behaviour of pore fluid pressure in the region of interest in a way as defined above:

- a drill bit can be provided on a lower end of a drill string; whereby
- the lower end of the drill string is lowered in a bore hole in the subsurface formation;

while during assessing pore fluid pressure in the region of interest:

- the drill bit can be operated to deepen the hole.--

Paragraph on line 31 of page 6 has been amended as follows:

--These and other features and preferred features of the invention will be elucidated below by way of example and with reference to ~~the~~ an accompanying drawing.~~, wherein~~

On page 7, above line 1, insert--Brief Description of the Drawings

In the accompanying drawings:--

On page 7, above line 24, insert--Detailed Description of the Invention

In accordance with the invention, pore fluid pressure in a region of interest in a subsurface formation below the earth surface is assessed. A stress value representative of formation stress is determined in a measurement region of the subsurface formation being located displaced from the region of interest, and the stress value is used for detecting presence of non-hydrostatic pore fluid pressure in the region of interest.

It has been found that the formation stress in a region displaced from the region of interest, is affected by the formation pore fluid pressure in the region of interest. The invention is thus based on the insight that, observation of the formation stress in the measurement region outside the region of interest provides information on the pore fluid pressure in the region of interest. For instance, pore fluid information can already be obtained with respect to a region that has not yet been reached in a drilling operation.

It is an advantage of the invention that results can for instance be used in deciding about which mud weight to employ and/or setting casing.--

On page 8, after line 30, please insert the following paragraphs:

-- The method of the invention is stress-based rather than porosity-based, and therefore it is less dependent on porosity state of the formation than is the case in undercompaction techniques. Added reliability is gained compared to porosity-based methods, at least in that a high pore pressure is detectable in cases where high pore pressure is not accompanied by undercompaction.

The method of the invention can be utilized on its own merits, or as a complementary technique in combination with existing methods.

The region of interest may in some preferred cases be a subsurface hydrocarbon reservoir.--

On page 9, after line 26, please insert the following paragraphs:

-- The method is particularly advantageous in a case where the pore fluid pressure in the region of interest is an over pressure, being a pore fluid pressure that is higher than the purely hydrostatic pressure, because the stress in the region of measurement can then be used to predict the over pressure and thereby a kick during drilling can be avoided. If successfully applied prior to drilling, the method will assist in exploration of hydrocarbons in high pressure regions an in optimum well design.

In an embodiment of the invention, the use of the stress value for detecting non-hydrostatic pore fluid pressure in the region of interest includes inferring an effective stress value representative of the difference between the formation stress in the measurement region and a value of pore fluid pressure in the measurement region.

An inference of effective stress can be simpler and take less rig time in a drilling operation than a true stress measurement. Moreover, since the true stress in the measurement region adjacent to for instance an over pressure region already increases while the pore fluid pressure in the measurement region may still be hydrostatically determined. Therefore, an over pressure in the region of interest is accurately predictable by an increase in the effective stress value just adjacent the onset of the over pressure region.--

In an embodiment of the invention, determining the stress value includes determining a stress value representative of a principal formation stress in one of the three principal stress directions in the stress tensor.

The principal direction can be selected to provide an optimal sensitivity in the measurement region to an abnormality in the pore fluid pressure in the region of interest. It has been found that the minimal principal stress direction provides the most optimal measurability. Often, the minimal principal stress direction coincides with the horizontal direction.

In an embodiment of the invention, two or more stress values or effective stress values, are inferred, each at a different depth in the measurement region. Herewith a depth-survey can be produced.

In particular, a variation of the two or more stress values or effective stress values as a function of their depths is inferred, and compared to a nominal value. By monitoring a deviation from the nominal value, information is obtained about a possible abnormality in the pore fluid pressure in the region of interest.

Preferably, three or more stress values or effective stress values are inferred, which allows for determining a deviation from a trend in a depth-survey in the measurement region. Such a deviation from a trend can contain pore fluid pressure information relating to the region of interest.--

On page 11, after line 2, please insert the following paragraph:

--Suitably, a pressure boundary wherein the behaviour of the pore pressure changes from hydrostatic to non-hydrostatic is detected, preferably while the pore pressure in the measurement region is still hydrostatically determined. Suitably, a deviation of the pore fluid pressure in the region of interest from the hydrostatical pore fluid pressure in the region of interest is detected.--

On page 14, above line 1, insert:--We claim:--